Implicit and Explicit Gender Stereotypes and Their Relationship to Self-Concept

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Abstract

Traditionally, boys are viewed as better in math and sports than girls. This study examines children's implicit and explicit gender stereotype endorsement and their self-ratings in math and sports. Fifty-seven children participated. The affective misattribution procedure (AMP) was used to measure implicit stereotypes, and children completed a paper and pencil measure of explicit stereotypes and self-concept. No correlations were found between implicit and explicit stereotypes among boys and girls, suggesting implicit and explicit views are not in accordance. Boys and girls differed on both implicit and explicit stereotype measures. A significant three-way interaction on explicit stereotype scores showed that girls viewed girls as equally competent in math and sports, whereas boys viewed girls as better in math than in sports. Both boys and girls viewed boys as better in sports than girls, and as better in sports than in math. Implicit scores indicated that boys were also more likely to associate girls with being better at math than sports. Regarding gender group stereotype endorsement, boys support traditional sports stereotypes, but not traditional math stereotypes. Contrary to expectations, girls' implicit scores showed that both boys and girls were more strongly associated with being good in sports than with being good in math. Boys reported significantly higher self-concept than girls in math and sports. Results indicate that gender stereotypes still exist, but they differ by gender. These differences potentially impact behavior within the classroom environment, as well as career path choices later on.

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Implicit and Explicit Gender Stereotypes and Their Relationship to Self-Concept

Gender stereotypes are still present and pervasive in the United States and can impact children's academic and athletic performance (Rowley, Kurtz-Costes, Mistry, & Feagans, 2007). Stereotypes are qualities assigned to groups, which may or may not accurately reflect the actual characteristics of such groups (Pickering, 2007). Gender stereotypes can be assessed in many forms, through direct or indirect means, and can be positive, negative, or neutral. Misattributions, otherwise called mistaken attributions, refer to judgments of neutral stimuli that reflect stereotypes. For example, many individuals are more likely to believe they saw a weapon rather than a cell phone when it is paired with the photo of an African American man (Payne, Cheng, Govorun, & Stewart, 2005). In this case, the photo of an African American man might elicit a fear reaction, which is then mistakenly attributed to the ambiguous object (cell phone/handgun). These misattributions, labeled and experienced routinely, are often unrecognized by the individual such that he or she does not realize that a stereotype has caused the misattribution (Payne et al., 2005). One way in which these stereotypes and misattributions shape individual development is through their influence on children's perceptions of their abilities in both academic and athletic domains (Evans, Copping, Rowley, & Kurtz-Costes, 2011; Kurtz-Costes, Rowley, Harris-Britt, & Woods, 2008).

A prevalent stereotype in the United States is that girls are better than boys in literary domains, while boys are viewed as better than girls in the Science, Technology, Engineering, and Mathematics (STEM) domains (Evans et al., 2011). Boys are also perceived as more talented in athletics than girls. Research into these stereotypes will help us better understand the messages sent to youth regarding academic and athletic gender stereotypes, as well as how such societal attitudes influence the outcome of today's youth, particularly during adolescence.

Societal attitudes about gender influence individuals' perceptions of themselves (Ames, 2004). In adolescence, children become more aware of stereotypes and membership in their gender group (Rowley, et al., 2007). This increased awareness influences beliefs and behavior. Therefore, it is important for researchers to study the development of such stereotypes, specifically as they become salient from middle childhood to early adolescence. The study of stereotype development in children may better aid researchers in disentangling the roots of how, when, and why such stereotypes become more salient and influence children's developing identity-related beliefs.

Implicit and Explicit Stereotypes

Researchers have studied both implicit and explicit stereotypes. Implicit stereotypes are automatically activated and operate indirectly, and thus individuals may not be aware that they possess such beliefs. In contrast, explicit stereotypes are accessible to conscious awareness and are what individuals report when asked about group differences. Examining both implicit and explicit stereotypes aids in the understanding of the overarching development of stereotypes by uncovering the development of attitudes regarding gender in adolescents. In this study, I aim to examine the relationship between implicit and explicit attitudes about gender; this relationship will be explored through the examination of girls' and boys' stereotypes about gender differences in math and athletic ability.

Implicit Attitudes

Implicit attitudes, in contrast with explicit attitudes, are automatic and uncontrolled (Payne et al., 2005). The most common method used to measure such attitudes is to record reaction times to assigning a characteristic to presented stimuli. Slower reaction times demonstrate that more thought must go into the decision making, indicating that the stimuli (e.g.,

pairing "butterfly" with "ugly" instead of with "beautiful") might be inconsistent with the individual's beliefs. Measures of implicit attitudes can be used to better understand the early foundation of stereotypes in adolescents. Banaji and Greenwald (1995) demonstrated the unconscious nature of implicit stereotypes, showing that stereotypes impact people's attitudes without their knowledge of such an influence. Additionally, whether or not behavior reflects an underlying implicit attitude is dependent upon whether the individual wants to avoid showing the attitude by taking more time to answer, such as the fear of appearing racist or sexist. Therefore, the outcome may depend on whether or not the individual is trying to avoid the influence (Blair & Banaji, 1995).

Wilbourn and Kee (2010) measured implicit attitudes in a sample of 57 children who were 8 to 9 years old. The researchers found it took children more time to create a sentence with a male name and a stereotypically female occupation (e.g. nurse) than in other gender-occupation pairings that were stereotype congruent (e.g., female name with female occupation, and male name with male occupation) or incongruent (e.g., female name with male occupation) Wilbourn & Kee, 2010). Additionally, they found that counterstereotypic pairings of a typically male name with a female occupation, and a typically female name with a male occupation, were more salient to children of both genders; participants demonstrated less difficulty recalling pairing of a male name with female occupation, or female name with male occupation. The researchers suggest that these results indicate it took participants more time to encode this information, and therefore were more likely to remember it later on given that it was an abnormal pairing (Wilbourn & Kee, 2010). These findings suggest that gender stereotypes still persist, particularly among youths. Wilbourn and Kee (2010) concluded that society is harmful to boys with a lack of encouragement for their participation in traditionally female occupations. This research suggests

that even today, jobs usually considered to be feminine are less respected by both genders than are jobs traditionally held mostly by men.

Several measures of implicit attitudes have been developed. Greenwald, McGhee, and Schwartz (1998) developed the Implicit Attitude Test (IAT) as an indirect means of assessing implicit attitudes. This assessment includes pairings of words with objects on a desktop computer. Individuals are instructed to press one of two keys after viewing a stimulus to pair the word with an object. After a designated number of trials, the meaning of which key is pressed to denote a positive or negative attribution is alternated. Reaction times are measured to analyze how long it takes to pair certain words and stimuli together, and then how long it takes to switch back (Greenwald et al., 1998). For example, pairing "spider" with "good" and "ladybug" with "bad" may take longer than pairing "ladybug" with "good" and "spider" with "bad" based on preconceived notions. However, problems arise when relying solely upon the IAT to discern implicit attitudes. The IAT has participants categorize, instead of formulate, an overall opinion. Categorization into groups does not necessarily directly indicate an opinion or a stereotype. In the task individuals are asked to give a correct answer, not to provide an opinion of their individual attitude (Payne, Burkley, & Stokes, 2008). In recent years, other measures of implicit attitudes have been developed. Specifically, through the measurement of misattribution of affect, researchers are better able to decipher subconscious attitudes (Payne et al., 2005).

A misattribution is a type of belief that is considered to be unknown to the individual, and is experienced everyday (Payne et al., 2005). The Affect Misattribution Procedure (AMP) is a task created by Payne, Hall, Cameron, and Bishara (2010) to measure implicit misattributions. Conceptually, the AMP can be compared to the Rorschach inkblot test, as it is projective in nature; individuals are given an item displayed on a computer screen to make sense of, and then

ultimately apply their own feeling to the event (Payne et al., 2005). The attribution is not only measured in the form of "good" or "bad," but also timed to measure how long an individual takes to make a judgment. Payne and his colleagues (Payne, Hall, Cameron, & Bishara, 2010) formulated the AMP to measure implicit attitudes as a way of addressing concerns about the IAT. The AMP procedure allows researchers to better identify stereotypes that are formulated and maintained subconsciously (Payne et al., 2010). The AMP is also significant in that individuals may not know how they respond emotionally to different sources of priming (Payne et al. 2010). The benefits of the AMP measure include larger effect sizes, increased reliability, increased ease of use, and overall decreased resistance to improvement efforts (Payne et al., 2005). Implicit measures allow researchers to overcome issues associated with self-reported explicit measures. The measurement of implicit attitudes increases the likelihood of measuring an automatic internal stereotype, and responses are less likely to be influenced by social desirability.

Explicit Attitudes and Their Relationship to Implicit Attitudes

In contrast to implicit attitudes, explicit attitudes are more outwardly salient, and people are usually aware that they hold such attitudes or beliefs, at least when asked. Explicit measures of attitudes can be direct or indirect. A common way to measure these attitudes is through the use of Likert scales in which the respondent compares members of two groups either directly (e.g. "Boys are better than girls in math") or indirectly by rating the abilities of each group separately. The Visual Analog Stereotype Scale (VASS) uses indirect comparisons, allowing individuals to rate on a 100-milimeter line the abilities of various social groups (e.g., boys, girls) in various domains (e.g., sports, music, math) (Kurtz-Costes, et al., 2008). This scale allows an explicit measurement of stereotypes, where the participant is aware of their decision-making process.

Because of this awareness, a potential problem with such explicit measures is that individuals might not report their actual beliefs in order to present themselves in a positive light. While it is true that implicit and explicit measures do not share many of the same attributes (Nosek, 2007), it is worthwhile to examine correlations between implicit and explicit measurements of attitudes to better understand the process of stereotyping. By evaluating both implicit and explicit attitudes, an overall picture of the development of stereotype attitudes in adolescence can be formed. Nosek (2007) suggested that although the measurements are different, the underlying constructs are related.

Payne and colleagues (2010) suggest that implicit and explicit attitudes are related, but perhaps only when the individual being tested is not trying to control his or her responses (Payne et al., 2010). Payne et al., (2010) also found racial differences within the AMP procedure. Specifically, Whites are more likely to show implicit bias with the procedure towards Blacks, than Blacks are towards Whites. This finding applies to adults, however, and has not been examined in children. Stewart, von Hippel, and Radvansky (2009) investigated age-related differences in implicit prejudices between young and older White adults using the IAT. Their findings suggest that differences in implicit prejudices are due to abilities of inhibition. These authors suggest that these age differences in stereotypes appear not because of actual differences between age groups, but because young adults are more capable than children of using discretion in their unconscious expression of implicit stereotypes. Therefore, other methods of evaluation of attitudes, such as measuring self-concept in adolescents, aid in the understanding of stereotype and identity formation. Self-concept is important for motivation, and beliefs about social groups are likely to influence views of the self, particularly across time. In turn, views of the self are also likely to influence views of the group (Ames, 2004). One goal of the current study was to

examine the relationships between children's gender stereotypes about math and sports and their beliefs about their own abilities in those domains.

Self-Concept

Self-concept refers to individuals' perceptions of their own traits and abilities. Self-concept is important in academic domains because it can greatly impact motivation and academic performance. While this measurement is important in the study of academic stereotypes, self-concept can also be measured in other domains, such as sports. Researchers have examined how beliefs about self-performance in various domains (e.g., math ability) are related to beliefs about how social groups (e.g., one's own racial or gender group) perform in the same domain (e.g., Evans et al., 2011).

Self-concept impacts both the judgments and behaviors of individuals (Briñol, Petty, & Wheeler, 2006). The study of how implicit and explicit attitudes impact decision-making, and how stereotypes are related to self-concept would be beneficial to the overarching understanding of individuals' attitudes. The development of beliefs about self in adolescence undoubtedly shares a bi-directional relationship with beliefs about others, including gender and racial groups. An individual's belief about self influences beliefs about the overall group of which they belong (Ames, 2004). While it cannot be assumed that implicit and explicit attitudes are the same (Briñol et al., 2006), it would be beneficial to better understand the relationship between each of these measures and self-concept to better understand the development of academic self-concept.

Hypotheses

In this study, I examined the relationships between children's implicit and explicit stereotypes to further clarify the mixed findings of prior research. For girls, I expected to find no relationship between implicit and explicit attitudes about girls' ability in math and sports

(*Hypothesis 1)* because it is advantageous for self-esteem to not endorse stereotypes that reflect negatively on one's social group (Rowley et al., 2007). The absence of a consistent relationship between implicit and explicit traditional stereotype endorsement could be viewed as a protective measure for girls. In contrast, I expected that boys, who are positively stereotyped in math and sports, would show responses favoring boys on both implicit and explicit measures, and these scores would be positively correlated within each domain (*Hypothesis 2)*. Implicit and explicit stereotype endorsement when rating boys and girls was posited to depend on gender, with boys showing traditional attitudes on both implicit (*Hypothesis 3a)* and explicit (*Hypothesis 3b)* measures, and girls showing traditional implicit attitudes (*Hypothesis 3a)* but either egalitarian or non-traditional (favoring girls) explicit beliefs (*Hypothesis 3b)*. Also, consistent with prior research, it was expected that boys would have higher self-concept in math and sports than girls because these are domains in which boys are positively stereotyped (*Hypothesis 4)*.

Method

Participants

The participants for this study were 57 children (19 girls, 38 boys) living in the southeastern United States. Children were from a summer Young Men's Christian Association (YMCA) sports camp (n = 23) and an elementary afterschool program (n = 34). Participants' ages ranged from 8 to 13 years with an average age of 9.5 years (SD = .98). Information about children's race and ethnicity was available for 50 children. Of those children, 31 were non-Hispanic Caucasian, 9 were Latino American, and 10 were African American. Parents gave their consent for their child to participate in the study, and children also gave their assent to participate in the study. One survey was missing at random, and is not expected to influence results.

Procedure

Data were collected at two different sites. An undergraduate research assistant recruited participants by visiting a local YMCA and obtaining permission from the organization, as well as the participants and their parents. Graduate student research assistants also recruited participants by visiting local schools. Upon entry to the site of data collection, trained graduate and undergraduate research assistants explained the procedure to the participants. Laptop computers were used to measure children's implicit attitudes using the Affective Misattribution Procedure (Payne et al., 2005). Because many of the participants were young children, research assistants explained the instructions regarding how to use the laptop and which buttons to push for the attributions of "GOOD" or "NOT GOOD" (in that particular domain). Research assistants also offered to read each of the slides aloud to children who might not be able to read the instructions. Children were told that the study examines how people make guesses about the meanings of words.

Children also completed a paper and pencil survey that included an explicit measure of stereotypes and a measure of self-concept. Data were collected twice in order to measure test-retest reliability, and children were compensated for both trials. For the completion of the Trial 1 portion of the study, children were given the choice of an item from a goody bag. For the completion of Trial 2, each child received a $10 gift card. Together, the AMP and the questionnaire took about 30 minutes to complete.

Apparatus and Measures

First, children completed the AMP implicit attitude measure. Children first saw a prime of a child's face (Black or White, boy or girl) flashed briefly for 250 ms, before the flashing of a Chinese symbol for 200 ms, followed by a pattern mask. Afterwards, participants chose whether they believed the Chinese symbol signified being "GOOD" or "NOT GOOD" within each

domain of math, sports, and language arts. In total, three stereotype domains were measured: math, sports, and language arts. Initial trials included a fourth domain of science, but due to participant fatigue, the researchers elected to shorten the implicit measure and remove the science domain. The domains were presented one at a time before the next domain measure occurred. The participants underwent two practice trials before data were recorded. For each domain (i.e., sports, math, language arts), each child viewed 40 photos of faces (10 of each of these groups: African American girls, African American boys, White girls, and White boys). Presentation of photos and presentation of domains (i.e., math, sports, language arts) was randomized across participants. These scores were compiled into a larger database. Scores within each group (i.e., the number of times the child chose the Chinese symbol as meaning "good" in a particular domain) were added and divided by ten for each social group (e.g., White girls, White boys, Black girls, Black boys) to create an overall proportion of positive association for each participant for each photo among all of the trials.

Explicit Stereotypes

Explicit stereotypes were measured by asking children to rate the competence of social groups (i.e., boys, girls, Blacks, Whites) in several academic and non-academic domains (e.g., math, English, science, sports, music). Two questions were asked for each academic domain. The first question asked participants to rate each group's performance in each academic domain, and the second question asked for a difficulty rating of how difficult/easy each group found the academic subject. For each item, children were asked to place a single vertical line on a 100-millimeter line indicating beliefs about group members' ability in that domain. On the 100-millimeter scale, the aforementioned belief ratings ranged from "Not well at all" to "Very well" and "Very hard" to "Very easy," respectively. Research assistants scored children's responses by

measuring the number of millimeters from the left scale anchor to the vertical line drawn by the child, with item scores ranging from 0 to 100, and higher scores indicating greater competence of group members in that domain. All items for each social group were presented together, and social groups were counterbalanced with race (e.g., Black, White) and gender (e.g., boy/girl) groups non-adjacent.

Self-Concept. Academic and athletic self-concepts were measured on a scale from 1 to 25. Children were instructed to circle a figure on the vertical scale of figures from *1* (Worst) to *25* (Best), showing how they perceived themselves compared to their peers in each domain. Self-concept was measured in several academic and non-academic domains, but for the purpose of this study only math and sports self-concept were used.

Results

Descriptive Statistics

On the explicit stereotype measure, children's scores for the two math items within each social group were averaged. Table 1 contains means and standard deviations for the whole sample as well as a breakdown by participant gender. For the AMP measure, analyses were conducted only on children's responses to items in which photos of White girls and White boys appeared. AMP items that included photos of Black children were not included in the analyses because of possible race by gender interactions. However, Table 1 includes overall means and standard deviations for children's implicit gender stereotype endorsements collapsed across race as well as scores for gender stereotype endorsement using only photos of White children.

Correlations Between Implicit and Explicit Stereotype Endorsement

A correlational analysis was run to determine whether implicit and explicit stereotypes in math and sports were positively related among boys (*Hypothesis 1*) and girls (*Hypothesis 2*).

Boys were expected to show a relationship, while girls were expected to have no relationship. Using scores on the explicit stereotypes measure, difference scores were calculated subtracting children's rating of girls from their rating of boys' competence in each domain, thus showing the strength of their endorsement of traditional gender stereotypes. Similar difference scores were calculated for children's responses to the AMP, showing to what extent boys were more likely to be associated with math/sports competence than girls. Correlations between these implicit and explicit scores were calculated separately for boys and girls. None of the correlations was significant. In the domain of math, the correlation between implicit and explicit stereotypes among boys was $r(38) = .15$, $p = .39$; among girls it was $r(19) = -.27$, $p = .28$. For the domain of sports, the correlations between implicit and explicit scores were $r(38) = -.08$, $p = .64$ among boys and $r(19) = .03$, $p = .89$ among girls. *Hypothesis 1* was supported: Girls implicit and explicit stereotypes were not related in math or sports. However, *Hypothesis 2* was not supported: Boys' implicit and explicit domain-specific stereotypes also were not correlated.

Gender Differences in Implicit Stereotype Endorsement

Implicit stereotype endorsement was posited to depend on gender, with boys showing traditional attitudes on both implicit and explicit measures, and girls showing traditional implicit attitudes but either egalitarian or non-traditional (favoring girls) explicit beliefs. In order to determine whether implicit stereotype endorsement differed by gender such that boys showed traditional attitudes and girls did not (*Hypothesis 3a)*, a 2 (Gender: boys' ratings versus girls' ratings) X 2 (Domain: math vs. sports) X 2 (Target Gender: photos of girls versus photos of boys) analysis of variance (ANOVA) was conducted, with proportion of positive affiliation as the dependent variable. Participant gender was a between subjects variable, and Domain (sports, math) and Target Gender were within subjects variables. The main effect of Target Gender, the

Gender x Target Gender interaction, and the Target Gender x Domain interaction were significant, $F(1, 55) = 43.39$, 4.00, and 71.72, *p's* < .05. The main effect of Gender, the Rater Gender x Target Gender interaction, and the Rater Gender X Target Gender X Domain were not significant, $F(1, 55) = 0.98$, 1.17,1.14, *p's* > .05. *Hypothesis 3a* was partially supported for the domain of sports: Boys associated boys more than girls with "good at sports." However, girls were equally likely to select "good at sports" after viewing photos of either boys or girls (see Figure 1). The hypothesis was not supported within the math domain, as boys were more likely to associate girls with "good at math" than boys. Girls' "good at math" proportion scores did not differ depending on the gender of the child in the target photo.

Gender Differences in Explicit Stereotype Endorsement

To test *Hypothesis 3b* that children's explicit stereotype endorsement would differ by gender such that girls would not report traditional math and sports stereotypes while boys would endorse traditional stereotypes, a 2(Gender: boys' ratings versus girls' ratings) x 2 (Domain: math vs. sports) x 2(Target Gender) ANOVA was conducted, with explicit stereotype scores (on a scale of 1-100 mm) as the dependent variable. Rater Gender was a between subjects variable, and Domain (math; sports) and Target Gender (competence of girls; competence of boys) were within subjects variables. The main effect of Domain, the Rater Gender X Target Gender interaction, the Target Gender X Domain interaction, and the Rater Gender X Domain X Target Gender interaction were all significant, $F(1,55) = 71.72$, 9.89, 4.00, *p's* < .05. The Rater Gender X Domain interaction approached significance, $F(1,55) = 2.80$, $p = .10$. The main effect of Target Gender was not significant, $F(1,55) = .74$, $p = .39$. Boys and girls reported no gender differences in the math domain, but gender differences in the sports domain. Boys viewed girls as better in math than sports, but girls did not view girls as equally competent in math and sports.

Both boys and girls viewed boys as better in sports than math. The hypothesis was partially supported that stereotype endorsement would depend on gender, as boys rated boys as significantly better at sports than girls, but this same significant difference was not found in the math domain (see Figure 2 & Figure 3).

Self-Concept in Math and Sports by Gender

One-way ANOVAs were conducted to analyze gender differences in math and sports self-concept. Boys reported having significantly higher self-concept than girls in both math and sports $F(1,55) = 6.3$ and 7.7, respectively, p's $< .05$. *Hypothesis 4*, that traditional stereotypes would be reflected in gender differences in self-concept, was supported for both math and sports (see Figure 4).

Discussion

From early childhood, children begin to categorize social groups, and gender groups become more and more salient. In this study, I examined the relationships between implicit and explicit stereotypes and also examined gender differences in children's implicit and explicit attitudes. I hypothesized that girls would not explicitly endorse math and sports stereotypes in order to bolster self-esteem, but that their implicit attitudes would reflect knowledge of those stereotypes. For girls, I expected to find no relationship between implicit and explicit attitudes about gender differences in math and sports. This hypothesis was supported as no correlation was found. Girls were not consistent in endorsing traditional stereotypes both explicitly and implicitly, potentially as a self-protective measure. In contrast, I expected that boys, who are positively stereotyped in the domains of math and sports, would show responses favoring boys on both implicit and explicit measures, and that those scores would be positively correlated within domains. This finding was not supported, as no correlation was found between implicit

and explicit stereotype endorsements in math or sports among boys. This finding suggests that, like girls, boys are not demonstrating consistency in the relationship between implicit and explicit stereotype endorsement.

Children's implicit and explicit gender stereotype endorsement was expected to differ by gender. The significant three-way interaction on explicit stereotype scores showed that girls viewed girls as equally able in math and sports, whereas boys viewed girls as better in math--an academic domain--than in sports. Both boys and girls viewed boys as better in sports than girls, and also as better in sports than in math.

Implicit scores indicated that boys were also more likely to associate girls with being "good in math" than as "good in sports." Although boys were more likely to select "good in sports" after viewing a photo of a boy than a photo of a girl, they were equally likely to indicate that a Chinese character indicated "good in math" after viewing either gender. These results support the hypothesis that boys support traditional sports stereotypes, but not the hypothesis that they would endorse traditional math stereotypes. Contrary to expectations, girls' scores on the AMP showed that both boys and girls were more strongly associated with being good in sports than with being good in math.

The hypothesis regarding gender differences in self-concept was supported: Boys reported higher self-concept than girls in domains in which they are traditionally positively stereotyped. This result suggests that at the individual level, boys have more self-confidence than girls in domains in which they are traditionally positively stereotyped, whereas the finding that boys did not consistently endorse a relationship between implicit and explicit stereotype endorsement suggests that at the group level, individual differences among boys are not consistent in terms of their misattributions.

Limitations

Given that this study took place in two separate locations, a possible confounding variable for this study includes the two types of sites where data collection took place. The first set of data collection took place at a summer sports camp with mostly male campers, while the second portion of the study took place at a structured school environment. Children were pulled out of their current sports camp activity in the first round of data collection, while children were pulled out of a classroom setting in the second wave of data collection. The mindset of each group possibly differed at the time of data collection, with academic standards more salient in a school setting, and sports standards more salient in the YMCA setting. Additionally, the sports camp had significantly more male than female campers, possibly influencing the mindset of both groups, making gender identity more salient at one location than another location.

Fatigue was problematic for some of the participants. After preliminary data collection, the researchers decided to remove the science section of the implicit, laptop portion of the study because children began to show boredom and exhaustion. This removal decreased the total number of trials. It was helpful to make this change to prevent the children, many of whom were younger than 10, from experiencing boredom and frustration. Children learn at different rates, and reading level could certainly differ among children who participated in this study. Reading level undoubtedly differed not only among participants within the same grades, but between grades as well.

Another limitation of the study was the lack of attention to race and ethnicity. At the second data collection site, several participants were Latino. It would be interesting to examine cultural differences in implicit and explicit data measures to determine if individuals from varying cultures are interpreting measures differently. Additionally, Latino Americans were

asked to rate group differences for Black and White students, but not Latino students. Regarding ethnic or racial identity, the measures should include the group of the participating children when possible. Having been left out of the racial category could influence responses, whether decreasing or increasing bias.

The implicit and explicit stereotype endorsement measures differed in that the implicit AMP measure used photographs of children. These photographs differed by race and gender, complicating the ability to disentangle race from gender identity. Therefore, the analysis of the implicit data is composed of all White participants rather than collapsing across race. This complication could have influenced the results.

When studying gender differences, it is possible for the gender of the data collector to influence the responses of the participants. However, the researchers tried to avoid this problem by not watching children's responses and by using a blank copy of the explicit questionnaire when children raised questions. These procedures were used in order to increase the comfort level of the participants and make children feel comfortable responding accurately and truthfully. However, race and gender did differ among research assistants, and it is possible that the results were influenced by the gender or race of the data collector.

Future Research

Today, immigration is a controversial issue in the media. Children of immigrants are in the public school system, and future studies could incorporate an analysis of group differences between native and non-native implicit and explicit stereotype endorsement of Latino children. Cultural awareness may be necessary in today’s school systems to comprehend cultural barriers, including language barriers, within the school system. Systematic study of both the gender

stereotypes of Latino children as well as non-Latino children's views of gender differences in the abilities of Latinos would enhance our understanding of stereotype development.

While it is true that children of this age are aware of gender stereotypes, it is also likely that parental stereotype endorsement impacts their children's stereotype endorsement. Wood, Kurtz-Costes, Rowley, and Okeke-Adeyanju (2010) found that within African American families, African American mothers had higher educational expectations for their daughters than sons. A possible explanation for the finding that boys report being better than average across domains is to possibly view the group in which they identify as more competent in order to overcompensate for lower expectations. This circumstance could be a result of the need to boost self-esteem as a protective measure against negative stereotypes. While Wood et al. (2010) examined gender only within African American families, future research could examine the relationship between parental and child stereotype endorsement across a diverse ethnic sample. The messages parents send their children regarding gender stereotypes could be conscious or unconscious, but likely influence what subjects in school both boys and girls pursue, as well as career paths later on in their lives.

Future studies should replicate these findings. The lack of correlation between explicit and implicit stereotype endorsement indicates that there is a discrepancy between how individuals view other groups, both externally and internally. However, this lack of correlation could also be related to children's responses to covering up undesirable social attitudes. By this age, children have well-formed beliefs about differences between boys and girls. Students may or may not consciously understand that they are not consistently explicitly and implicitly endorsing gender stereotypes, but adolescence is a vital time period in development to try to understand the development of gender stereotypes.

An electronic explicit measure to facilitate the process of data collection and make the process more fluid would also be beneficial. Researchers discussed making this adaptation during the study in order to provide more uniformity in the data collection. Given that these data were Time 1 data, it would be beneficial to analyze Time 2 data, utilizing the ability to match the gender of the data collector to the participant in order to reduce the probability that research collector gender influences the outcomes. Ideally, this future replication would match the gender of the data collector with the gender of the participant in order to remove any confounding variable of potential demand characteristics. If the gender is not matched, children could possibly change their responses based on what they think the data collector would like to see rather than how they actually feel.

As evidenced in this study, traditional stereotypes are still present under certain circumstances, and such stereotypes differ by gender. Future studies should study stereotype endorsement longitudinally, both implicitly and explicitly to accurately measure developmental changes. While the measures may be difficult to employ with younger children, examining implicit and explicit stereotypes within younger groups could be useful for assessing developmental changes. Stereotype endorsement impacts behaviors of both boys and girls within the classroom environment, and the importance of studying the development of such stereotypes is vital in promoting productive learning environments for both boys and girls.

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Table 1

Means and Standard Deviations for Implicit Attitudes, Explicit Attitudes, and Self-Concept, by Rater Gender

	Rater		
	Boys' Ratings (n = 38)	Girls' Ratings (n = 19)	Total (N = 57)
Implicit Attitudes			
Sports			
Boys (Black and White)	0.65 (0.14)	0.48 (0.16)	0.59 (0.17)
Girls (Black and White)	0.51 (0.14)	0.54 (0.10)	0.52 (0.13)
Boys (White only)	0.65[b] (0.14)	0.64[a] (0.16)	0.59 (0.17)
Girls (White only)	0.51[a] (0.23)	0.64[a] (0.21)	0.55 (0.23)
Math			
Boys (Black and White)	0.53 (0.12)	0.47 (0.11)	0.51 (0.12)
Girls (Black and White)	0.56 (0.12)	0.56 (0.10)	0.56 (0.11)
Boys (White only)	0.59[b] (0.18)	0.42[b] (0.21)	0.53 (0.20)
Girls (White only)	0.64[a] (0.18)	0.45[b] (0.16)	0.64 (0.17)
Explicit Attitudes			
Sports			
Boys' Competency	89.6[a] (15.20)	87.9[a](19.12)	89.1 (16.43)
Girls' Competency	44.6[c] (24.71)	60.90[b] (19.36)	49.9 (24.12)
Math			
Boys' Competency	72.1[b] (14.60)	66.2[b] (19.39)	70.1 (16.38)
Girls' Competency	70.4[b] (14.95)	68.2[b] (16.80)	69.7 (15.45)
Self-Concept			
Sports	19.7[d] (5.65)	15.3[e] (5.64)	18.2 (5.97)
Math	19.3[d] (4.07)	16.2[e] (5.05)	18.3 (4.62)

Note. Standard deviations in parentheses. Superscript indicates the means are significantly different from each other, p's < 0.05

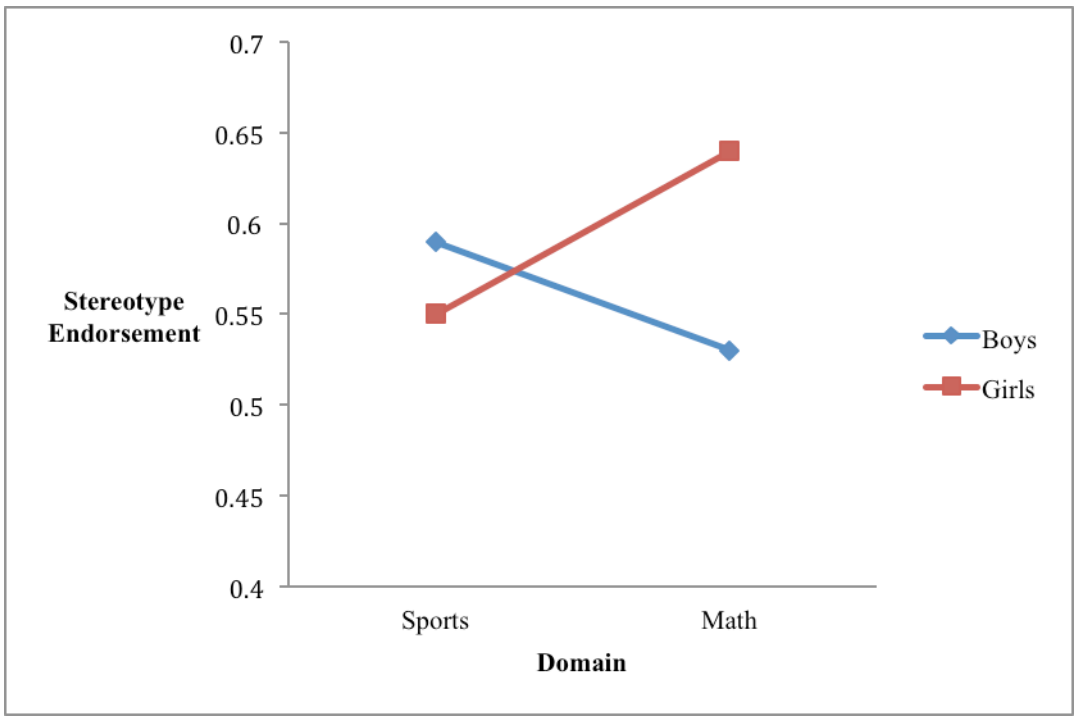

Figure 1. Interaction between domain and target gender for Implicit Stereotype Endorsement.

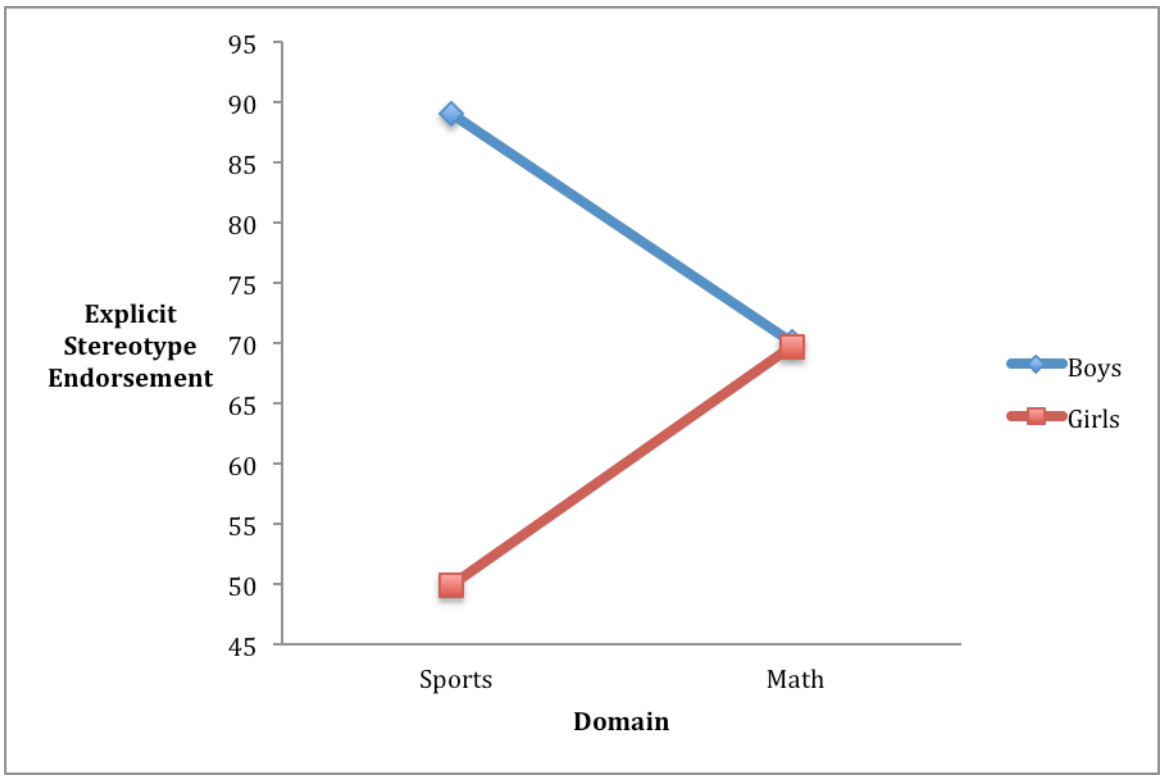

Figure 2. Interaction between domain and target gender in Explicit Stereotype Endorsement.

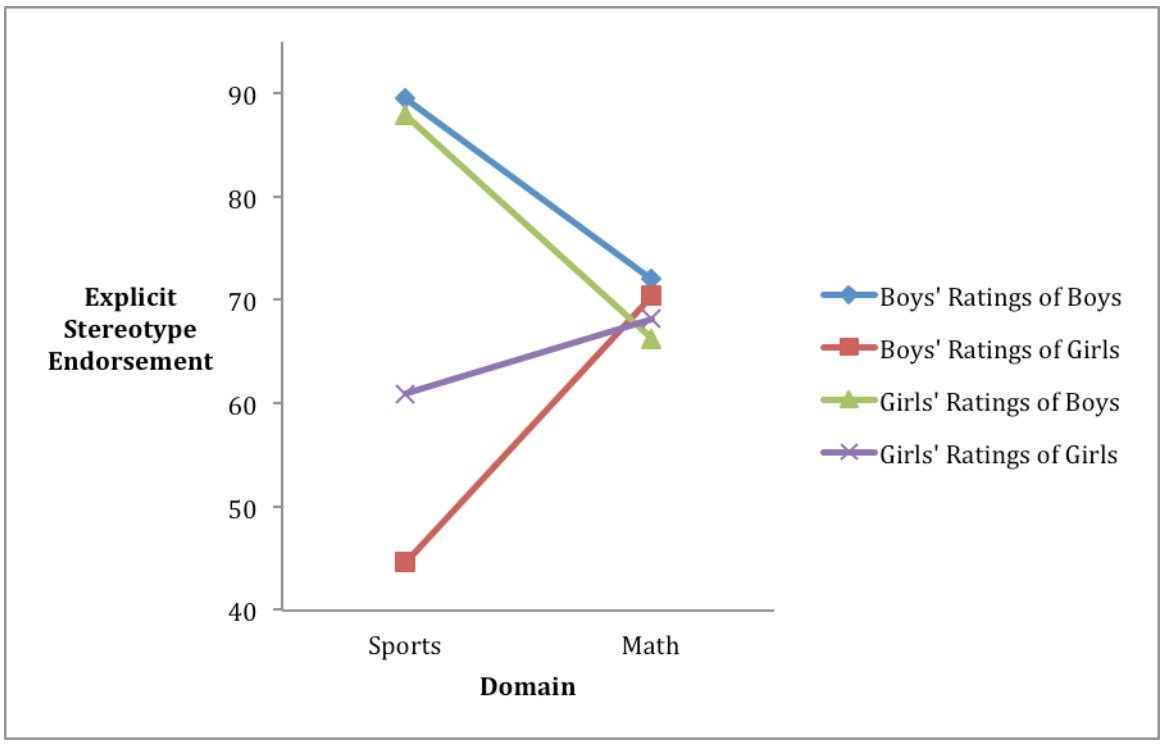

Figure 3. Interaction between rater gender, target gender, and domain in Explicit Stereotype Endorsement.

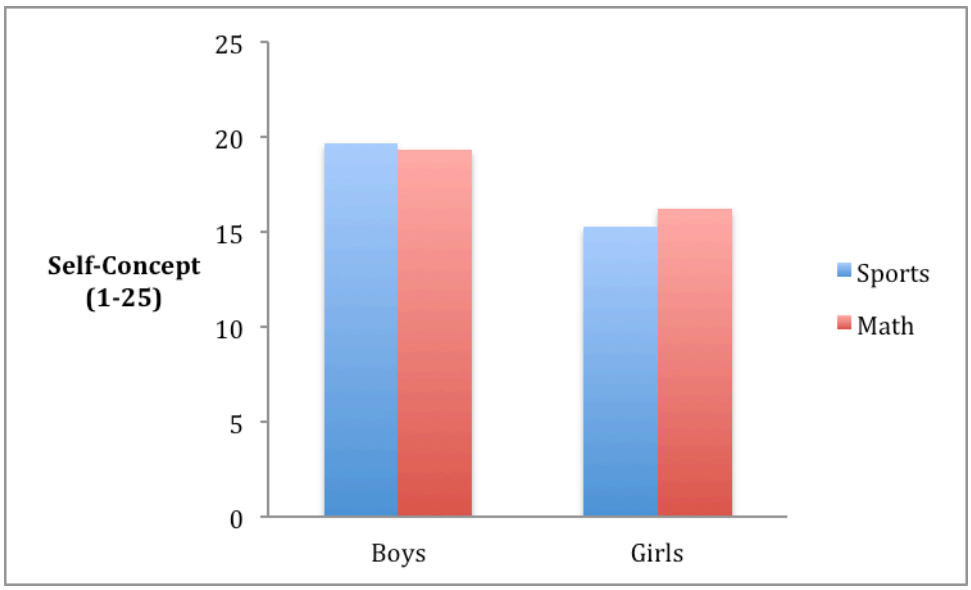

Figure 4. Mean difference values illustrating self-concept differences in each domain for boys and girls.